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Global Climate and the Security of the European Union

by

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GLOBAL CLIMATE AND THE SECURITY OF THE EUROPEAN UNION

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Climate change is a natural process in the history of the earth, but man and his technique contributes to the deepening of the changes. The effects of climate change will be visible as natural disasters, storms or rising of sea levels have direct impact on human security in sectors of the economy, food production, health and environment. Changes in these sectors may cause instability and in worst case scenario a fight for survival. Every geographical region will be affected by climate change. Reports of the Intergovernmental Panel on Climate Change (IPCC) provide broad information on anticipated climate change and potential environmental and socio-economic impacts. This paper considers connections between climate change and security and violent conflict, based on the current state of knowledge, and looks for existing threats on stability and security of the European Union.

GLOBAL CLIMATE AND THE SECURITY OF THE EUROPEAN UNION

The impact of environmental change on human security is not a new issue. The first time that issue was considered was 1960 in connection with the use of chemical pesticides in daily human life,[1] and the impact on human health of testing nuclear weapons[2]. Over the years the problem was, however, overlooked or more precisely undervalued due to the dominant concern of the *Cold War*. The effects of climate change are not immediately visible. It is a continuous process and continuous processes need a long-term policy. The difficulty in formulating a proper long term policy for climate change was another reason some politicians avoided dealing with the problem

After the *Cold War,* the issue returned in 1990 as a matter of worldwide debate. At the beginning it was viewed in terms of diminishing natural resources that could lead to international conflicts, especially in the relation to population growth in less developed countries. However, as technology was developed (more effective use of materials, recycling), there was a change in the generally accepted assessment that the emergence of conflicts based on resource constraints was unlikely. Recent research on climate change, led by the United Nations and other organizations, indicates that the climate change anticipated in the near future may pose a threat to many sectors and systems of human life (ecosystem, food production, health, water). Changes in these sectors and systems may cause instability in human life, and in the worst case may endanger human survival. Climate change is a natural process in the history of the earth, but man and his actions contribute to the deepening of the changes. The problem of climate change and security has been already recognized within the European Union.

In 2008, the problem was presented in *Paper from the High Representative and the European Commission to the European Council.*[3]

In order to evaluate the impact of climate change on stability and security of the European Union, we must first examine the definition of security. Then drawing on the conclusions of the Intergovernmental Panel on Climate Change[4] (IPCC) reports we will summarize the work of scholars concerning the impact of climate change on security. Next, the assessment of politicians and policy makers will be presented to show their point of view. Finally, I will examine the threats to the EU based on the on the predicted climate change for Europe and neighboring regions of the Middle East and North Africa.

The Definition of Security and the Resulting Consequences

Security is directly associated with the existence of threat. In its original sense it means, following Berkowitz, Morton and Bock, "National security can be most fruitfully defined as an ability of a nation to protect its internal values from external threats"[5]. In that view security can be directly understood as a state of being free from danger or threat. Security in the sense presented above indicates the existence of such conditions that guarantee state independence, ensure its sovereignty, territorial integrity and noninterference in its internal affairs. External threat, in that definition, also includes threats coming from inside the country, which may undermine its foundations. The fundamental value that is protected under national security is the survival of the nation.

Currently, security is no longer understood in such a narrow way. The security concept has evolved over the time. Today, it means not only protection of the existing values and achievements, but expectations for the future values that the future may bring as well. The definition of security in its original form immediately points the solution which should be undertaken. The external threats (especially the external

military threat) immediately imply the need to have power and means to overcome them (the opponent's armed forces). Such a solution existed in the security strategies of many countries until the end of the *Cold War*. With the end of *Cold War* and at least lessening of a direct physical threat, the sphere of security began to include more and more areas of social and political life.

Today, security is no longer understood as physical security only, but has come to be understood as a security in the areas of food, health, money and trade[6] as well. Globalization has made the world a system of connected vessels, in which each country plays an important role. Any changes in the system interact in all its elements positively or negatively. Thus, the necessity of maintaining the system in good shape emerges as the most important task for all participants, which in turn leads to security.

Human Security and Changes in the Environment

Human life focuses on maintaining the balance in three areas, namely: the area of nature, which is a substratum of existence; the economic area which indicates the level of "metabolism" between the world of man and nature; and the socio-political area which is the center of control, both in interpersonal interactions as well as in human relationships with nature. Following Meadows and Randers,[7] to maintain a stable and sustainable development, society must meet three conditions:

- the rate of consumption of renewable resources cannot exceed the rate of their reconstruction;
- the rate of consumption of non-renewable resources cannot exceed the rate of production of ecologically safe renewable substitutes,
- the emission of pollution rate shall not exceed the assimilative capacity of the environment.

The great simplification of the first condition relates to the maintenance of access to food and its production capacity, the second to increase the standard of living and the third condition is the link between the other two. The third condition means an involvement of man in environmental degradation, and thus determines man's duty to maintain a balance in the area of renewable resources. The loss of that balance may present a threat to human security.

Survival of the human species depends on the survival of the world's plants and animals and by the world's climatic conditions. We nourish ourselves with the biomass which is organic matter. Fresh air, clean water and food are the most elementary needs of our species. All human activities are mainly conducted to satisfy the basic conditions for survival and then to improve living conditions. Thus, any change within the environment can lead to imbalances in the vital areas and lead to risk of survival of the species. Hence the conclusion emerges that human security is based on free access to renewable resources such as fertile soil, forests, and water sources and the existence of fauna and flora. Renewable resources are permanently linked to the territory which is occupied by human beings. Thus, this territorial factor, in which the consumption and recovery of renewable resources occur, is another component of human security.

Human Security in the present time, however, is understood more broadly than just dependence on the basics. Today, according to the definition proposed by the United Nations Development Program (UNDP) in *Human Development Report*[8] human security is recognized as:

> [ ] Human security can be said to have two main aspects. It means, first, safety from such chronic threats as hunger, disease and repression. And second, it means protection from sudden and hurtful disruptions in the patterns of daily life – whether in homes, in jobs or in communities. Such

> threats can exist at all levels of national income and development. [ ] The list of threats to human security is long, but most can be considered under several main categories. These categories include economic security, food security, health security, environmental security, personal security, community security, political security.[9]

It should be noted that any changes in global climate will affect the areas of human security. At least three of them are directly related (food security, health security and environmental security) and will change with climate change. At the critical moment, changes that threaten security may lead to social unrest or other actions for survival. Could that lead to violent conflict?

What are the Predictions of the IPCC in Relation to Global Warming?

The IPCC issued its first report on Climate Change, *The IPCC Assessment*, in 1990. That report predicted a number of effects of global warming in the twenty-first century[10]: The report predicts that sufficient evidence is now available from a variety of different studies to indicate that changes of climate would have an important effect on agriculture and livestock. Projected changes in temperature and precipitation suggest that climatic zones could shift several hundred kilometers towards the poles over the next fifty years. The report indicates that relatively small climate changes can cause large water resource problems in many areas. The most vulnerable human settlements are those especially exposed to natural hazards, e.g. coastal or river flooding, severe drought, landslides, severe wind storms and tropical cyclones. Global warming will accelerate sea-level rise, modify ocean circulation and change marine ecosystems, with considerable socioeconomic consequences. Finally, the report predicts that the extent and volume the cryosphere (seasonal snow cover, near-surface layers of permafrost and some masses of ice) will be substantially reduced.

The IPCC's most recent report, *Climate Change 2007 Synthesis Report,*[11] *the impacts of future climate changes on the various systems and sectors.*

- Ecosystem:
  Unprecedented combination of climate change, associated disturbances (e.g. flooding, drought, wildfire, insects, ocean acidification) and other global change drivers (e.g. land use change, pollution, fragmentation of natural systems, overexploitation of resources). Approximately 20 to 30% of plant and animal species assessed so far are likely to be at increased risk of extinction. Negative consequences for biodiversity and ecosystem goods and services, e.g. water and food supply.

- Food:
  Crop productivity is projected to increase slightly at mid- to high latitudes. At lower latitudes, especially in seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases. Globally, the potential for food production is projected to increase,

- Coasts:
  Increasing risks including coastal erosion, due to climate change and sea level rise. By the 2080s, many millions more people than today are projected to experience floods every year due to sea level rise. Small islands are especially vulnerable,

- Industry, settlements and society:
  The most vulnerable industries, settlements and societies are generally those in coastal and river flood plains,

- Health:
  The health status of millions of people is projected to be affected through, for example, increases in malnutrition; increased deaths, diseases and injury due to extreme weather events; increased burden of diarrheal diseases; increased frequency of cardio-respiratory diseases due to higher concentrations of ground-level ozone in urban areas related to climate change; and the altered spatial distribution of some infectious diseases,

- Water:
  Climate change is expected to exacerbate current stresses on water resources from population growth and economic and land-use change, including urbanization. On a regional scale, mountain snow pack, glaciers and small ice caps play a crucial role in freshwater availability. Widespread mass losses from glaciers and reductions in snow cover over recent decades are projected to accelerate throughout the 21st century, reducing water availability, hydropower potential, and changing seasonality of flows in regions supplied by melt water from major mountain ranges.

These impacts represent potential threats for human security.

In the view of the research and proposals presented by the IPCC, the problem of national security as a result of changes in global climate has been increasingly analyzed. Research has attempted to find the relationship between climate change, security and violent conflict.

The Scientists' Point of View

Up to the pre-industrial era "wars were primarily fought for control of arable land."[12] In the twentieth century from World War I to the War in the Falklands twelve conflicts took place over access to natural resources.[13] Among them are: the Chaco War of 1932-35 fought for control of oil deposits, World War II fought for control of German living space, the Nigerian Civil War 1967-70 fought for control of Biafra oil deposits, El Salvador-Honduras War of 1966 fought over immigration issues, the Anglo-Icelandic Clash of 1972-1973 fought for control of coastal fishing rights. In ten cases the reason for the war was access to oil/or minerals. In five conflicts control of renewable resources was a major factor. Two conflicts were related to other reasons. Looking at the relationship between scarcity of renewable resources, and the occurrence of violent conflicts Thomas F. Homer-Dixon came to the following conclusions:

- changes in renewable resources will contribute more to social turmoil in coming decades than climate change or ozone depletion;
- scarcity of renewable resources is function not environmental change only but population growth and unequal social distribution of resources as well;
- environmental change, population growth and unequal distribution of resources often interact, and
- societies are able to adapt to environmental scarcity.[14]

Homer-Dixon determined that the scarcity of renewable resources will not cause simple-scarcity conflicts between states (countries that are most dependent on renewable

resources are poorer and less prone to raise conflict). He also determined that scarcity of renewable resources may cause large population movements, which may finally lead to group- identity conflicts (due to structure of migration, number of migrants belonging to specified culture, assimilation capability of host nation, tempo of new population growth in new place). Finally, he determined that scarcity of renewable resources may simultaneously increase economic deprivation and disrupt key social institutions, which in turn may cause state internal conflicts such as civil strife and insurgency. Scarcity of renewable resources causes additional burdens for country's budget and demands from poorer populations, weak governments may find it difficult to resolve a problem with economic tools, the use of power against demands of population may escalate leading to social unrest. This last outcome can create cause for country fragmentation or emergence of authoritarian governments. Both elements in turn could lead to tension in international relations, hence to conflict between states, however not as an effect of scarcity of renewable resources, but as a way to divert popular attention from internal stresses.

Jon Barnett[15] in *Security and Climate Change*[16] claims that not every country will be affected in the same way by climate change saying that "environmental change can be considered as a security issue depending on who is to be secured, and how environmental change threatens them."[17] In his view, climate change will impact the territorial sovereignty and national security of some countries. He claims that "physical processes as sea-level rise may undermine national security in serious ways."[18] Like Homer-Dixon, he recognizes that climate change in its indirect way may have negative effects that can undermine state legitimacy, "it may: undermine individual and collective

economic livelihood, affect human health through reduced availability of fresh water and food, and by exposing people to new disease vectors, undermine state wealth and military capability, and exacerbate inequalities between people"[19] and that the mitigation of climate changes will have financial costs, they could be difficult to be justified as 5necessary to bear for security issues.

Barnett makes a link between climate change and violent conflict. In his opinion climate change may be an exacerbating factor in violent conflict in the future because climate change will lead to degradation of grasslands and boreal and tropical forests, desertification, water resources stress and coral bleaching, but "conflicts in which environmental change appears to be a contributing factor tend to be within rather than between states."[20] Barnett also gives a few points to consider in connection with climate change:

- the most important factor preventing environmental conflicts is political and economic structure of state. Its wealth, the insurance industry and transport and communications infrastructure will have huge impact in preventing of internal turmoil caused by environmental changes. "Strong states tend to be less prone to internal conflicts.
- the most sensitive to climate change are renewable resources (water supply system, forestry activities, agriculture systems, and coastal zones and fisheries).
- migration when climate is increasingly variable extreme and events may become more frequent and more severe can be an attractive or sometimes the only option, but migration itself will not lead to violent conflict, the conflict may occur as a clash of national identity.
- climate change should be addressed more as a foreign policy issue than military one.[21]

In another article, *Climate change, human security and violent conflict,*[22] Barnett has developed a few ideas about the relationship between determinants of human insecurity, violent conflict and climate change.[23] He claims that impacts on livelihood will

be widespread both in developing and developed countries. Poverty may be increased by climate change through its effects on resource sectors and the ability to provide social safety nets. Climate change will be the great challenge for *weak states,* because for *weak states* climate change may decrease the ability of states to create opportunities and provide important freedom for citizens. Governmental agencies may not have enough capacity to adapt and respond to climate change itself. He also recognizes that *large-scale movements* of people may increase the risk of *conflict in host communities*.

The conclusions of the scientific work carried out by the German Advisory Council on Global Change[24] (WBGU) look similar to Barnett. The Council presents four conflict constellations making linkages between the environment, society and violence.

The first conflict constellation called “Climate-induced degradation of fresh water resources” predicts that demand for water is increasing due to the world’s growing population and its mounting aspirations. This dynamic triggers distributional conflicts and poses major challenges to water management systems in the countries concerned. However, the countries which will suffer the greatest water stress are generally those which already lack the political and institutional framework necessary for the adaptation of water and crisis management systems. This could overstretch existing conflict resolution mechanisms, ultimately leading to destabilization and violence.

The second conflict constellation is called “Climate-induced decline in food production.” This trend will be substantially reinforced by desertification, soil salinization or water scarcity. In South Asia and North Africa, for example, the areas suitable for agriculture are already largely exploited. This may well trigger regional food crises and

further undermine the economic performance of weak and unstable states, thereby encouraging or exacerbating destabilization, the collapse of social systems, and violent conflicts.

The third conflict constellation called “Climate-induced increase in storm and flood disasters” recognizes that storm and flood disasters have already contributed to conflict in the past, especially during phases of domestic political tension, e.g. in Central America, India and China. Conflicts are likely to occur more frequently in the future, firstly because regions especially at risk from storm and flood disasters generally have weak economic and political capacities. Secondly, frequent storm and flood disasters could cause major damage and trigger and/or intensify migration processes that are difficult to control.

The fourth conflict constellation is called “Environmentally-induced migration.” Experience has shown that migration can greatly increase the likelihood of conflict in transit and target regions. Most environmental migration is initially likely to occur within national borders. Transboundary environmental migration will mainly take the form of south-south migration, but Europe and North America must also expect substantially increased migratory pressure from regions most at risk from climate change.

Assessment of Politicians and Policymakers

The researchers conducted their research and drew conclusions based on case studies from the past. They tried to find a common model that could give grounds for action in the future. Politicians usually do not delve into the past. However, they take and execute decisions.

During the last two decades the importance of global warming in policymaker’s minds has raised from *save the planet* to *a security problem*. In American policy *save*

the planet trends can be represented by Senator Quayle “for the first time we are talking about the impact of CO2 to the ozone layer,”[25] Vice President Gore “I think that in this 21st century we will soon see the consequences of what's called global warming”[26] and George W. Bush “the earth's well-being is also an issue important to America.”[27] The George W. Bush administration observed the growing relationship between climate change and security “recognizing the vital need for the major economies to work together to achieve the common objectives of reducing global greenhouse gas emissions, increasing energy security and efficiency, and sustaining economic growth.”[28] Finally, President Barrack Obama makes direct connections of climate change, security and violent conflicts stating that “urgent dangers to [our] national and economic security are compounded by the long-term threat of climate change, which if left unchecked could result in violent conflict, terrible storms, shrinking coastlines and irreversible catastrophe.”[29]

In the essay *The Security Implications of Climate Change*[30] John Podesta[31] and Peter Ogden[32] predict that geopolitical consequences of climate change are not and will not be just a result of the climate changes themselves, they will also be a result of political, social and economic activities. In developing countries, a relatively small change in climate can result in food shortages, water shortages, and spread of diseases, migration and competition for natural resources. Water shortages may lead to food shortages, which can lead to conflicts over existing resources, which may lead to migration that, in turn, can cause food shortages in new regions and new tensions.

That vision may cause the *domino effect*. The problem which may arise in just one region can be spread to the whole world. Podesta and Ogden predict the main

cause of internal or international conflicts (violent conflicts) will be migration, weak or failing states, water competition and restrictions on people and goods movements.

Migration, mainly in developing countries, can lead to conflicts over resources and cultural and ethnic conflicts mostly in India, Bangladesh, Africa, and Europe. Weak or failing states will not be able to respond to emerging problems especially in Africa. Water competition or deliberate water supply disruption can be expected in the Middle East where 75% of all the water is located in Iran, Iraq, Syria and Turkey. Restrictions on population movements can be expected in the event of water-born and vector-borne diseases. Restrictions on the movements of goods can be politicized in a way that generates significant international friction.

Podesta and Ogden suggest one more important problem; the problem of desensitization. Desensitization would be the destructive factor in international relations at a time when common effort and support for other countries and nations would be desired.

Other specialists have similar predictions. They recognize growing tensions between North and South and influence of climate change on migration both inside and between nations. In their view serious public health problems, interstate tensions, conflict over resources, and the collapse of markets may lead to destabilization with domestic political and social repercussions.[33] A combination of rapid population growth, degradation of environment, and natural resource scarcity in weak states may lead to large-scale violence[34] because weak states do not have enough capacity to secure their nations against climate change.[35]

There is an additional outcome coming from weakness of states in relation to climate change. In view of some, weakness in mitigating of climate change can lead to terrorism. “When a government can no longer deliver services to its people, ensure domestic order, and protect the nation’s borders from invasion, conditions are ripe for turmoil, extremism, and terrorism to fill the vacuum.”[36]

In such specific predictions, the role of three main moderators in relation to climate change appears: scientists – when looking for solutions, politicians – in terms of making the right decisions, and the media – in communicating reliable information. The scientific and political considerations on the relationship of climate change, security and conflict can be presented within three groups[37] with the hierarchy as follows:

- human security (economic security, food security, health security, environmental security, personal security, community security, political security),
- environmental security (renewable resources) with its connection to food security and health security,
- conflicts (environmental conflicts):
  - ✓ sub-state level conflicts due to climate-induced scarcity,
  - ✓ sub-state level conflicts due to state and its administration weakness and unpreparedness to scarcity of resources (weak or failing states, economic deprivation, disruption of key social institutions),
  - ✓ climate-induced migration conflicts (internal in host nations due to resources scarcity, ethnic and religious differences),
  - ✓ international conflicts when deliberate scarce resources (water) supply disruption occurs.

Relations between groups indicate that changes in the environment will pose threat for human security which in turn may initiate a conflict. Logically it seems that preserving the environment is the first step to preventing conflict. If not, the international support for countries mostly affected by climate change should be another step.

Projected Climate Change for Europe and its Impact on the Security of the EU

Impacts of climate change in Europe will be presented based on findings of the Center for Policy Studies (CEPS) *Future Impacts of Climate Change across Europe*.[38] That report incorporates data given by the fourth IPCC report and reports of the European Environment Agency (EEA), the European Commission (EC) and the Atomic Energy Authority (AEA). The report also covers results of different projects including EU-funded ones and explains anticipated climate changes impact on Europe in its three main EU regions and within 11 indicator categories. The three regions are as follows:

- Northern Europe (NEU) – Belgium, Denmark, Estonia, Finland, Ireland, Lithuania, the Netherlands, Sweden and UK,
- Central and Eastern Europe (CEEU) – Austria, Bulgaria, the Czech Republic, Germany, Hungary, Luxembourg, Poland, Romania, Slovakia, Slovenia and the Northern part of France,
- Mediterranean Countries (MCEU) – Cyprus, Greece, Italy, Malta, Portugal, Spain, and the southern part of France.

The summary of the report is presented in *Table 1*:

Climate change indicator	Northern Europe	Central and Eastern Europe	Mediterranean Countries
Direct losses from weather disasters	M(-)	M(-)	H(-)
River flood disasters	M(-)	H(-)	L(-)
Coastal flooding	H(-)	M(-)	H(-)
Public water supply and drinking water	L(-)	L(-)	H(-)
Crop yields in agriculture	H(+)	M(-)	H(-)
Crop yields in forestry	M(+)	L(-)	H(-)
Biodiversity	M(+)	M(-)	H(-)
Energy for heating and cooling	M(+)	L(+)	M(-)
Hydropower and cooling for thermal plants	M(+)	M(-)	H(-)
Tourism and recreation	M(+)	L(+)	M(-)
Health	L(-)	M(-)	H(-)

Table 1 Simplified summary of climate change impacts in Europe and their intensity.[39]

Notes: H: High; M: Medium; L: Low; (+) Positive impact; (-) Negative impact

Demographic data can supplement the above projected impacts. Demographic factors show that the population of the 27 European Union countries (EU27) is going to rise slowly up to 2060 (with the peak in 2040). “The EU27 population is projected to increase from 501 million on 1 January 2010 to 525 million in 2035, to peak at 526 million around 2040, and thereafter gradually decline to 517 million in 2060,” but at the same time “the EU27 population is also projected to continue to grow older, with the share of the population aged 65 years and over rising from 17% in 2010 to 30% in 2060.”[40] There will be differences between the member states and “between 2010 and 2060, the population is projected to rise in fourteen member states and fall in thirteen.[41]

There are a few challenges for the European based on the predictions of the impact of global warming. First, direct losses from weather disasters will increase all over Europe. Storms of increased frequency, resulting in floods are expected in Northern Europe and may cause problems with urban drainage, water management, erosion, slope stability and ground water recharge. Droughts will increase in Central and Eastern Europe and will mostly have an impact on Mediterranean countries and will be characterized by continuous draughts, occasional flash floods and forest fires. Overall the impact of direct loses will be on countries’ economic and insurance system.

Disasters from flooded rivers already visible, in Europe will mostly appear in Northern Europe and Central and Eastern Europe countries. Their overall impact will be to the economy particularly the agricultural sector. Coastal flooding can be expected as well. Its main effect is expected after 2050. Northern Europe and Mediterranean countries coasts will be most affected. Loss of properties and ground water salinization will be among the threats. Coastal flooding will have an overall impact on the economy.

With floods and draughts one can expect public water supply and drinking water problems. Mediterranean countries will be mostly exposed to that threat. Decline in water availability will be greatest in Mediterranean countries and in Southern Europe. Water problems will have an overall impact on the economy and population with water deficits on a daily basis. Most affected will be the agriculture and tourism sectors.

The agriculture sectors will be affected differently depending on the region. Crop yields in Northern Europe agriculture will largely benefit from warmer temperatures. Central and Eastern Europe will experience some improvement in crop productivity but, Mediterranean countries will experience the most negative influence. The overall impact will be on food production.

The same situation will be experienced in crop yields in forestry. The forest area is expected to expand in Northern Europe. In Central and Eastern Europe there will be changes in the forest species composition. Reduced productivity, more extensive forest fires and desertification in some areas are expected in Mediterranean countries. Once again the overall impact will be on economy.

The demand for energy for heating and cooling will be balanced. Northern Europe will be able to reduce the consumption of winter heating from the current high level of consumption. A similar situation can be predicted for Central and Eastern Europe. However, Mediterranean countries will have a great demand for summer cooling, but overall its demand for electricity will decline. The challenge in the energy sector will be readiness to provide energy for peaks in demand.

The energy sector will be most affected in hydropower and cooling for thermal plants. Hydropower potential in Northern Europe is expected to grow more than 25%.

Central and Eastern Europe and Mediterranean countries may experience a decrease in hydropower of around 25% in mid century and then decrease more. The cooling system for thermal power plants will be limited by increasing temperature of atmosphere and rivers. The overall impact will be on efficiency of power plants.

The tourism and recreation sectors will stay balanced. Northern Europe will benefit from warmer summers and milder winters; Central Europe and Mediterranean Alps, which now mostly relay on winter tourism will need to shift their focus to summer holidays due to reduction of snow areas and shorter season for skiing; Mediterranean coastal zones will experience reduction of tourism due to heat waves and water supply problems, so tourism may pick up in the spring and autumn. Changes in tourism's seasons should mitigate the impact on the economy.

Finally concerning climate change on human health, overall there will be increase in heat-related mortality rate in regions with rise of temperature (mostly in Central and Eastern Europe). The risk of spread of malaria is very low due to socio-economic conditions. In terms of human health issues the Mediterranean countries will be most affected. To summarize, the challenges of climate change in EU will not be the same in all three regions, will have an impact on economy, agriculture and insurance system, and will probably cause internal migration within EU's countries and between them, but not on a large scale.

The following conclusions on stability and security can be anticipated for the EU. First, changes due to global warming will not happen suddenly. Second, challenges outlined above generally will not pose a security threat to the EU. Third, although elements of human security will be threatened, they can be mitigated. Fourth, internal

unrest in a few countries is possible, but not on a large scale and there is no expectation that any European country is going to fail. Fifth, internal migrations will not be on a large scale and will be within boundaries of the EU, which is allowed. Sixth, international conflict or deliberate scarce resources supply disruption is less likely because the EU is globally connected.

As mentioned earlier the EU already recognized the problem of global warming. The first step taken by the EU was to limit Green House Gases emissions in Europe with financial implications on countries not following the rules, but the solution for the existing problem is mostly seen in terms of crisis management and responses to manmade and natural disasters only.[42] There has been no common planning and preparation for upcoming challenges.

Projected Climate Change for Middle East and North Africa (MENA). Implications for EU

According to the predictions of the IPCC, the Middle East and North Africa can be the most affected region in the global climate change. Precipitation is expected to decrease and draughts to increase. Egypt, Jordan, Lebanon and the Palestinian Territory will mostly experience decreased precipitation.

The agricultural production is expected to decline. Projected climate change in Middle East and North Africa countries are as follows:

- By the end of this century, this region is projected to experience an increase of 3°C to 5°C in mean temperatures and a 20% decline in precipitation. Due to lower precipitation, water run-off is projected to drop by 20% to 30% in most of MENA by 2050. Reduced stream flow and groundwater recharge might lead to a reduction in water supply of 10% or greater by 2050.
- Greater seasonal temperature variability.
- More severe weather events, such as droughts and floods.

- Significant sea level rise: the Mediterranean is predicted to rise between 30 cm and 1 meter by the end of the century causing flooding to coastal areas along the Nile Delta.
- Mediterranean biomes are expected to shift 300-500 km northward if a 1.5°C warming were to occur, which could mean that Mediterranean ecosystems (e.g. in Jordan) would become more desert-like.[43]

In conjunction with an expected significant increase in demography in this area, the region is expected to have 598 million inhabitants by 2050, increasing by two-thirds or 239 million more people than in 2010[44] and given the existing difficult political situation, the region seems to be particularly vulnerable in terms of security. *Climate change will act as a threat multiplier* that is likely to exacerbate existing vulnerability of the region to current climatic and non-climate stresses. *Competition over resources*, mass movement and outmigration are some of the expected outcomes of climate change in the Arab region. The *water competition* seems to be the main problem driving instability in Middle East and North Africa countries and *water-sharing arrangements* between countries will only become politically more difficult to achieve. Scarce water and food may trigger conflicts and civil wars, which are among the main reasons for mass migration and displacement and a warmer climate may expand the range of carriers of malaria, yellow fever, dengue fever, and other vector-borne diseases.[45] Problems in the Middle East and North Africa will lead to general instability with security implications in the region, expansion of diseases and (mass) migration. They will directly affect the European Union.

The instability in Middle East and North Africa may have influence on EU energy sector, but it is not able to undermine EU security due to its policy of diversification energy resources. The diseases can be “imported” to Europe, but surveillance system in EU countries should be able to detect and mitigate threat (European Centre for Disease

Prevention and Control[46]). Some loses will be inevitable; however with common effort the problem can be solved. The most challenging problem will be with immigration from Middle East and North Africa countries to Europe; not because of number of people trying to enter and settle in the EU, but because of cultural differences.[47] Experience shows that EU finds it difficult to integrate other cultures, especially Muslims. The Muslim population has not been fully integrated within EU society, although it has been present since the end of World War II. The majority of immigrants to Europe are Muslims. They are gathered in small, culturally homogenous communities like: Turks in Germany, Pakistanis in the UK, and Moroccans in Spain and Algerians in France. As of today the total the number of Muslims in Europe is estimated from 15 to 20 million, and it is predicted that number will be doubled by 2025.[48] The experience of the last decade suggests that problems exist and tensions and conflicts may occur. Problems of assimilation can be illustrated by the London bombings in July 2005, riots in the Parisian suburbs in October 2005, the murder of Egyptian woman Marwa Sherbini in a German Court in July 2009 and ban on the building of minarets in Switzerland in November 2009. European countries like the UK, Germany, France and the Netherlands have started their *integration policies* trying to *assimilate* Muslims rather than to create a policy of *multiculturalism*.

To avoid future cultural instability and tensions, a common EU immigrant policy is required. The policy should anticipate the influx of migrants and encourage the inflow of those who will be the most needed by EU countries (students, researchers, businesspeople and skilled workers). Fortunately, the EU has already recognized the need for common policy but the process is very slow.[49] As stated in Annual Report on

Immigration and Asylum (2010) the EU migration policy needs to reflect the EU labor market priorities and the role of immigration, in line with the Europe 2020 Strategy. The policy should be a long-term policy connected to geographic and thematic priorities of the EU and it requires strong cooperation among member states, EU institutions and relevant EU agencies.[50]

What are the Threats for EU Stability and Security in Relation to Climate Change?

Based on scientific and political discourse there is connection between climate changes, security and conflict. Although there is no direct influence of climate change on security and conflict, its indirect influence is very important and visible. Climate change will mostly affect poor, weak and failing states.

There are two main threats for EU security and stability in relation to climate change. First one challenges EU population in area of human security. The economy, agriculture and insurance systems will be affected differently in all three regions of EU. If EU were one state the problem could be more easily mitigated but, the EU is a federation of twenty seven independent states and agreement on required responses to emerging challenges is time consuming and difficult. Second, the most challenging external threat comes from immigration from the neighboring Middle East and North Africa region as a result of climate changes and insecurity issues in it, but even that process will not happen suddenly. Migration from Middle East and North Africa countries, as projected by the IPCC, is likely to happen. Part of that movement will be directed to Europe. Migration alone may not be a threat, but it carries identity, ethnic and culture with it. The EU contains representation of other cultures, however has failed so far to integrate them with European society, especially with Muslims which present the majority of new immigrants. Migration from Middle East and North Africa countries

means an increase number of Muslims. The EU may not be able cope with problem if ill-prepared, and that in turn may lead to clashes between cultures or more to violence and internal conflicts.

In both cases everything is in hands of the EU policymakers. Social, economic and political integration must be fully achieved and sustained; otherwise every EU country will have to pay attention to upcoming challenges alone, which means that if effort is not coordinated, results will be unsatisfactory.

Endnotes

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